What is claimed is:

1. A method for operating a direct injection diesel internal combustion engine (1), which is operated in a first operating region (A) corresponding to low to medium load (L_L) in such a way that combustion of the fuel takes place at a local temperature (T_L) below the temperature of NO_x formation (T_{NOx}) and with a local air ratio (λ_L) above the ratio at which particulates are formed (λ_{LS}), and in which fuel injection (I) is initiated at a crank angle (CA) of between 50° to 5° before top dead center (TDC) of the compression phase and exhaust gas is recirculated at an exhaust gas recirculation rate (EGR) of 50% to 70%, wherein in a second operating region (B) corresponding to medium partial load, fuel injection is started in a range from approximately 2° crank angle (CA) before top dead center (TDC) to approximately 20° crank angle (CA) after top dead center (TDC), and preferably in a range of approximately 2° crank angle (CA) before top dead center (TDC) to approximately 10° crank angle (CA) after top dead center (TDC).

2. A method according to claim 1, wherein exhaust gas is recirculated in the second operating region (B) at an exhaust gas recirculation rate (EGR) between 20% and 40%.

3. A method according to claim 1 or 2, wherein fuel injection in the second operating region (B) uses an injection pressure of at least 1,000 bar.

4. A method according to any of claims 1 to 3, wherein fuel injection in the first operating region (A) uses an injection pressure between 400 to 1,000 bar.

5. A method according to any of claims 1 to 4, wherein in the first operating region (A) the main part of combustion lies in the range of −10° to 10° crank angle (CA) before top dead center (TDC).

6. A method according to any of claims 1 to 5, wherein in a third operating region (C) corresponding to high partial load (T_H) or full load, the start (α_I) of the main part of fuel injection (I) occurs in a range from −10° to 10° crank angle (CA) after top dead center (TDC).

7. A method according to any of claims 1 to 6, wherein in the third operating region (C) multiple injection is used.

8. A method according to any of claims 6 or 7, wherein in the third operating region the exhaust gas recirculation rate is 30% at most, and preferably 10% to 20%.

9. A method according to any of claims 1 to 8, wherein the overall air ratio (λ) lies between 1.0 and 2.0.

10. A method according to any of claims 1 to 9, wherein exhaust gas recirculation is performed externally and/or internally.

11. A method according to any of claims 1 to 10, wherein the swirl value (D) is varied in at least one, and preferably in all, operating region(s) (A, B, C) depending on the load (L) and engine speed (n).

12. A method according to any of claims 1 or 11, wherein the effective compression ratio (ε) is varied by shifting the closing time (E_C) of at least one intake valve.

13. A method according to any of claims 10 to 12, wherein at least in the first and/or third operating region (A, C) internal exhaust gas recirculation is performed by opening the intake valve during the exhaust phase and/or by opening the exhaust valve during the intake phase.

14. A method according to any of claims 1 to 13, wherein changeover from the first to the second operating region (A, B), respectively from the

second to the first operating region (B, A), is initiated by reducing, respectively increasing, the exhaust gas recirculation rate.

15. A method according to any of claims 1 to 14, wherein changeover from the first to the second operating region (A, B) or vice versa is initiated by reducing the internal or external exhaust gas recirculation rate and by delaying the start of injection, respectively by increasing the exhaust gas recirculation rate (EGR) and moving the start of injection forward.

16. A method according to any of claims 1 to 15, wherein the decrease of the required exhaust gas recirculation rate (EGR) on changing from the first to the second operational region (A, B) is achieved by backshifting the opening and/or closing time (E_O, E_C) of the intake valve.

17. A method according to any of claims 1 to 16, wherein the effective mean pressure (p_{me}) in the first operating region (A) is between 0 to 6 bar, and preferably between 0 to 5.5 bar.

18. A method according to any of claims 1 to 17, wherein the effective mean pressure (p_{me}) in the second operating region (B) is between 3.5 to 8 bar, and preferably between 4 to 7 bar.

19. A method according to any of claims 1 to 18, wherein the effective mean pressure (p_{me}) in the third operating region (C) is at least 5.5 bar, and preferably at least 6 bar.

20. A direct injection diesel engine for implementation of the method according to any of claims 1 to 19, with a fuel injection system and an exhaust gas recirculation system, wherein the start (α_I) of fuel injection (I) may be varied in at least one operating region (A, B, C) between 50° before top dead center (TDC) and 20° after top dead center (TDC), and preferably up to 50° after top dead center (TDC), and wherein the exhaust gas recirculation rate (EGR) may be varied between 0 and 70%.

21. An internal combustion engine according to claim 20, wherein the fuel injection pressure may be varied at least between a first and a second pressure level, the first pressure level preferably covering a range of up to 1,000 bar and the second pressure level covering a range of at least 1,000 bar.

22. An internal combustion engine according to claim 20 or 21, wherein a device is provided for the changing of the swirl level.

23. An internal combustion engine according to any of claims 20 to 22, wherein a device is provided for the changing of the opening and/or closing time (E_O, E_C) of the at least one intake valve.

24. An internal combustion engine according to any of claims 20 to 23, wherein the valve timing of the intake valve and/or the exhaust valve may be shifted by means of a phase shifting device.

25. An internal combustion engine according to claim 24, wherein at least one intake valve can be activated during the exhaust phase.

26. An internal combustion engine according to claim 24 or 25, wherein at least one exhaust valve can be activated during the intake phase.